

CLAIMS

1. A method for recovering a polyhydroxyalkanoate from a polyhydroxyalkanoate-containing microbial cell

5 which comprises the following steps (a) and (b);

(a) a step comprising adding an alkali to an aqueous suspension of the polyhydroxyalkanoate-containing microbial cell while stirring and carrying out a physical disruption treatment to disrupt the cell, solubilizing or emulsifying cell substances 10 other than the polyhydroxyalkanoate in said cell, and then separating the polyhydroxyalkanoate from the aqueous suspension, and

15 (b) a step comprising treating the separated polyhydroxyalkanoate with an enzyme and/or a surfactant to solubilize impurities adhering to the polyhydroxyalkanoate or to solubilize them after decomposing, and then washing the polyhydroxyalkanoate with a hydrophilic solvent and/or water.

2. The method for recovering a polyhydroxyalkanoate 20 according to Claim 1

which further comprises the following step (c);

(c) a step comprising suspending the washed polyhydroxyalkanoate in a hydrophilic solvent and/or water and stirring at a temperature equal to or below the boiling point 25 of said suspension and agglomerating the polyhydroxyalkanoate to enlarge the particle diameter thereof, and then separating the agglomerated polyhydroxyalkanoate from the suspension.

3. The method for recovering a polyhydroxyalkanoate 30 according to Claim 1 or 2,

wherein the polyhydroxyalkanoate is a copolymer obtainable by copolymerizing at least two species of hydroxyalkanoate monomers selected from the group consisting of 3-hydroxybutyrate, 3-hydroxyvalerate, 3-hydroxypropionate, 4-hydroxybutyrate, 35 4-hydroxyvalerate, 5-hydroxyvalerate, 3-hydroxypentanoate,

3-hydroxyhexanoate, 3-hydroxyheptanoate, 3-hydroxyoctanoate, 3-hydroxynonanoate and 3-hydroxydecanoate.

4. The method for recovering a polyhydroxyalkanoate
5 according to Claim 3,

wherein the polyhydroxyalkanoate is a copolymer composed of 3-hydroxyhexanoate and at least one species among said hydroxyalkanoate monomers other than 3-hydroxyhexanoate.

10 5. The method for recovering a polyhydroxyalkanoate according to Claim 4,

wherein the polyhydroxyalkanoate is a copolymer composed of 3-hydroxyhexanoate and 3-hydroxybutyrate.

15 6. The method for recovering a polyhydroxyalkanoate according to any one of Claims 1 to 5,

wherein, in the step (a), the physical disruption treatment is carried out by a high-pressure homogenizer.

20 7. The method for recovering a polyhydroxyalkanoate according to any one of Claims 1 to 6,

wherein, in the step (a), the alkali is added continuously or intermittently while controlling a pH level.

25 8. The method for recovering a polyhydroxyalkanoate according to Claim 7,

wherein, in the step (a), the pH level is controlled between 9 and 13.5.

30 9. The method for recovering a polyhydroxyalkanoate according to any one of Claims 1 to 8,

wherein the alkali to be used in the step (a) is at least one species selected from the group consisting of sodium hydroxide, potassium hydroxide, lithium hydroxide and sodium carbonate.

10. The method for recovering a polyhydroxyalkanoate according to any one of Claims 1 to 9,

wherein the enzyme to be used in the step (b) is at least one species selected from the group consisting of proteases, 5 lipid degrading enzymes, cell wall degrading enzymes and DNases.

11. The method for recovering a polyhydroxyalkanoate according to any one of Claims 1 to 10,

wherein the surfactant to be used in the step (b) is at 10 least one species selected from the group consisting of anionic surfactants, cationic surfactants, amphotolytic surfactants and nonionic surfactants.

12. The method for recovering a polyhydroxyalkanoate 15 according to any one of Claims 1 to 11,

wherein the hydrophilic solvent to be used for the washing in the step (b) is at least one species selected from the group consisting of methanol, ethanol, acetone, acetonitrile and tetrahydrofuran.

20 13. The method for recovering a polyhydroxyalkanoate according to any one of Claims 2 to 12,

wherein the hydrophilic solvent used in the step (c) is at least one species selected from the group consisting of methanol, 25 ethanol, acetone, acetonitrile and tetrahydrofuran.

14. The method for recovering a polyhydroxyalkanoate according to any one of Claims 1 to 13,

wherein a microorganism containing the 30 polyhydroxyalkanoate is a microorganism selected from the group consisting of species belonging to the genus Aeromonas, Alcaligenes, Azotobacter, Bacillus, Clostridium, Halobacterium, Nocardia, Rhodospirillum, Psuedomonas, Ralstonia, Zoogloea, Escherichia, Candida, Saccharomyces and Yarrowia.

15. The method for recovering a polyhydroxyalkanoate according to Claim 14,

wherein the microorganism containing the polyhydroxyalkanoate is Aeromonas caviae.

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16. The method for recovering a polyhydroxyalkanoate according to any one of Claims 1 to 15,

wherein the microorganism containing the polyhydroxyalkanoate is a transformant obtainable by introducing a polyhydroxyalkanoate synthase group gene derived from Aeromonas caviae.

17. The method for recovering a polyhydroxyalkanoate according to Claim 16, wherein

15 the microorganism containing the polyhydroxyalkanoate is Ralstonia eutropha obtainable by introducing a polyhydroxyalkanoate synthase group gene derived from Aeromonas caviae.

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